the semiconductor device prior to the step of depositing the under bump metallurgy over the semiconductor device.

[0023] In another embodiment of the invention the first electrically conductive material comprises solder.

[0024] In another embodiment of the invention the second electrically conductive material comprises copper.

[0025] In another embodiment of the invention the second electrically conductive material comprises nickel.

[0026] In another embodiment of the invention the third electrically conductive material includes at least one of copper, nickel, silver and gold.

[0027] In another embodiment of the invention the step of depositing a first electrically conductive material comprises electroplating the first electrically conductive material into the opening in the photoresist layer.

[0028] In another embodiment of the invention the first electrically conductive material comprises solder electroplated into the opening in the photoresist.

[0029] In another embodiment of the invention the step of depositing a second electrically conductive material comprises electroplating the second electrically conductive material onto the first electrically conductive material.

[0030] In another embodiment of the invention the second electrically conductive material includes at least one of copper and nickel electroplated into the opening in the

photoresist.

[0031] Another embodiment of the invention includes a method of making electrically conductive bumps of improved height on a semiconductor device. The method includes a step of depositing an under bump metallurgy over a semiconductor device having a contact pad thereon and a passivation layer as an upper surface of the semiconductor device with an opening therein down to the contact pad and so that the under bump metallurgy extends into the opening and onto the contact pad. The photoresist layer is deposited, developed and patterned over the semiconductor device to provide an opening over the under bump metallurgy and aligned with the contact pad. A first electrically conductive material is deposited into the opening in the photoresist layer. A second electrically conductive material is deposited over the first electrically conductive material and over a portion of the photoresist layer. A flux agent is applied to the top surface of the second electrically conductive material. The semiconductor device is hard baked to remove any oxide on the second electrically conductive material. After the hard baking step, the photoresist layer is removed. The excess under bump metallurgy is removed to leave a portion of the under bump metallurgy on the contact pad and underneath the first electrically conductive material. A portion of the semiconductor device is dipped in an electroless plating solution. The semiconductor device is removed from the electroless plating solution to provide a third electrically conductive material deposited on the second electrically conductive material. Finally, the electrically conductive materials are reflown to form a bump of improved height on the semiconductor device.

[0032] Another embodiment of the invention further includes a step of sputter cleaning

the semiconductor device prior to the step of depositing an under bump metallurgy over the semiconductor device.

[0033] In another embodiment of the invention the first electrically conductive material comprises solder.

[0034] In another embodiment of the invention the second electrically conductive material comprises copper.

[0035] In another embodiment of the invention the second electrically conductive material comprises nickel.

[0036] In another embodiment of the invention the third electrically conductive material includes at least one of copper, nickel, silver and gold.

[0037] In another embodiment of the invention the step of depositing a first electrically conductive material comprises electroplating a first electrically conductive material into the opening in the photoresist layer.

[0038] In another embodiment of the invention the first electrically conductive material comprises solder electroplated into the opening in the photoresist.

[0039] In another embodiment of the invention the step of depositing a second electrically conductive material comprises electroplating the second electrically conductive material onto the first electrically conductive material.

[0040] In another embodiment of the invention the second electrically conductive material includes at least one of copper and nickel electroplated into the opening in the